

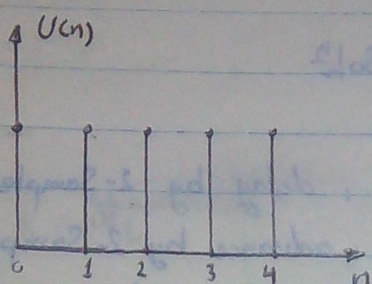
Digital Signal processing

Report 1

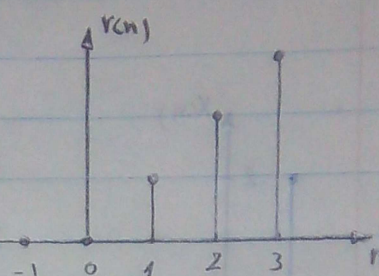
Solution of Q1:

Sketch $x(n) = u(n) + r(n-2) - r(n-5) - r(n-8) + r(n-11)$

Solⁿ



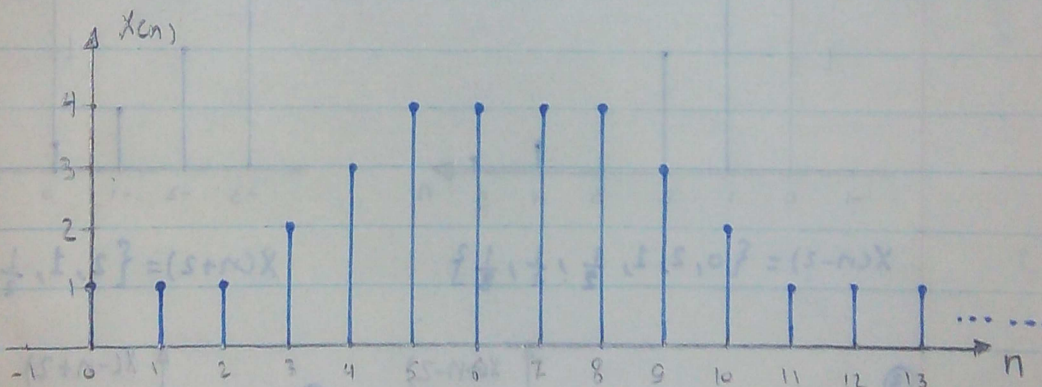
$$u(n) = \begin{cases} 1 & n \geq 0 \\ 0 & n < 0 \end{cases}$$



$$r(n) = \begin{cases} n & n \geq 0 \\ 0 & n < 0 \end{cases}$$

bb

For $r(n-k)$: $r(n-k) = \begin{cases} n-k & n \geq k \\ 0 & n < k \end{cases}$



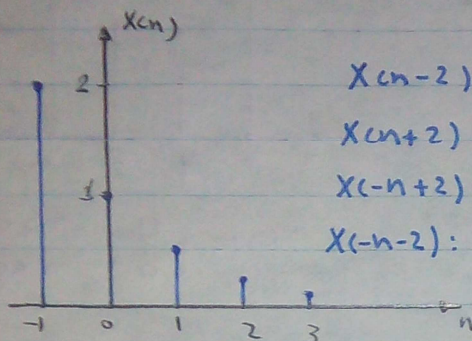
Solution of Q2:

Given $x(n) = \{2, 1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}\}$

Find:

- ① $x(n-2)$ ② $x(n+2)$ ③ $x(-n-2)$ ④ $x(-n+2)$

Solⁿ

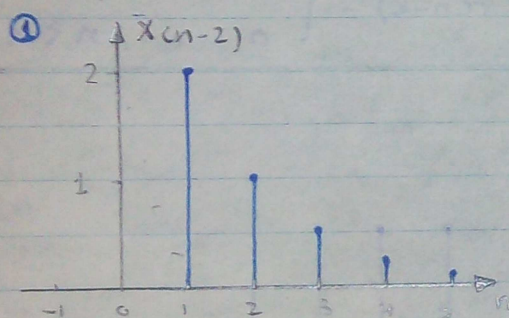


$x(n-2)$: delay by 2-Samples

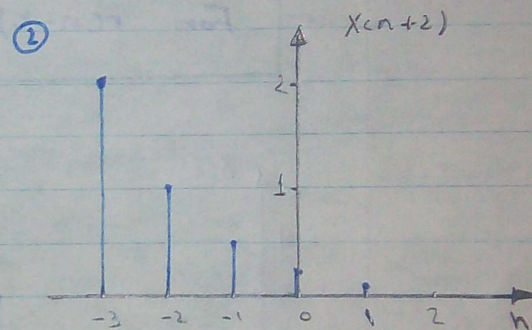
$x(n+2)$: advance by 2-Samples

$x(-n+2)$: Fold then delay or advance then fold

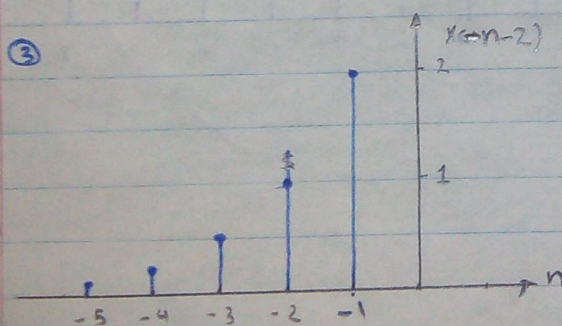
$x(-n-2)$: Fold then advance or delay then fold



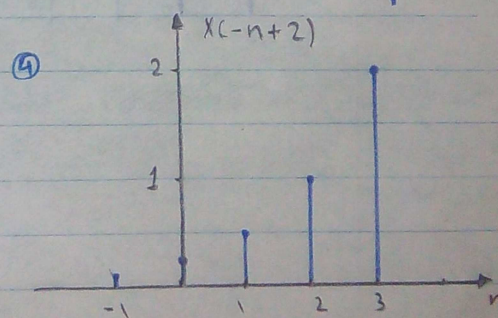
$$x(n-2) = \{0, 2, 1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}\}$$



$$x(n+2) = \{2, 1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}\}$$



$$x(-n-2) = \{\frac{1}{8}, \frac{1}{4}, \frac{1}{2}, 1, 2, 0\}$$



$$x(-n+2) = \{\frac{1}{8}, \frac{1}{4}, \frac{1}{2}, 1, 2\}$$